

LOW DROP POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

| | |
|-------------------|--------|
| $I_{F(AV)}$ | 10 A |
| V_{RRM} | 25 V |
| $T_j(\text{max})$ | 150 °C |
| $V_F(\text{max})$ | 0.35 V |

FEATURES AND BENEFITS

- VERY LOW FORWARD VOLTAGE DROP FOR LESS POWER DISSIPATION
- OPTIMIZED CONDUCTION / REVERSE LOSSES TRADE-OFF WHICH MEANS THE HIGHEST EFFICIENCY IN THE APPLICATIONS
- AVALANCHE CAPABILITY SPECIFIED

DESCRIPTION

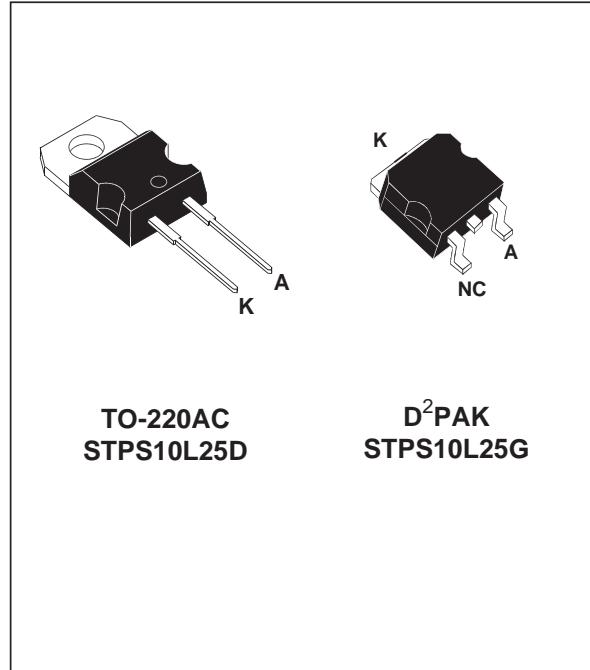
Single Schottky rectifier suited to Switched Mode Power Supplies and high frequency DC to DC converters.

This device is especially intended for use as a rectifier at the secondary of 3.3V SMPS units.

ABSOLUTE RATINGS (limiting values)

| Symbol | Parameter | | Value | Unit |
|---------------------|--|---|---------------|------------------|
| V_{RRM} | Repetitive peak reverse voltage | | 25 | V |
| $I_{F(\text{RMS})}$ | RMS forward current | | 30 | A |
| $I_{F(AV)}$ | Average forward current | $T_c = 140^\circ\text{C} \ \delta = 0.5$ | 10 | A |
| I_{FSM} | Surge non repetitive forward current | $tp = 10 \mu\text{s}$ Sinusoidal | 200 | A |
| I_{RRM} | Repetitive peak reverse current | $tp = 2 \mu\text{s}$ square $F = 1\text{kHz}$ | 1 | A |
| I_{RSR} | Non repetitive peak reverse current | $tp = 100 \mu\text{s}$ square | 3 | A |
| P_{ARM} | Repetitive peak avalanche power | $tp = 1 \mu\text{s} \ T_j = 25^\circ\text{C}$ | 5500 | W |
| T_{stg} | Storage temperature range | | - 65 to + 150 | °C |
| T_j | Maximum operating junction temperature * | | 150 | °C |
| dV/dt | Critical rate of rise of reverse voltage | | 10000 | V/ μs |

* : $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th}(j - a)}$ thermal runaway condition for a diode on its own heatsink



STPS10L25D/G

THERMAL RESISTANCE

| Symbol | Parameter | Value | Unit |
|----------------|------------------|-------|------|
| $R_{th} (j-c)$ | Junction to case | 1.5 | °C/W |

STATIC ELECTRICAL CHARACTERISTICS

| Symbol | Tests Conditions | Tests Conditions | Min. | Typ. | Max. | Unit |
|---------|-------------------------|---------------------------|----------------------|------|------|---------------|
| I_R * | Reverse leakage current | $T_j = 25^\circ\text{C}$ | | | 800 | μA |
| | | $T_j = 125^\circ\text{C}$ | | 135 | 260 | mA |
| V_F * | Forward voltage drop | $T_j = 25^\circ\text{C}$ | $I_F = 10 \text{ A}$ | | 0.46 | V |
| | | $T_j = 125^\circ\text{C}$ | $I_F = 10 \text{ A}$ | | 0.30 | |
| | | $T_j = 25^\circ\text{C}$ | $I_F = 20 \text{ A}$ | | 0.55 | |
| | | $T_j = 125^\circ\text{C}$ | $I_F = 20 \text{ A}$ | | 0.41 | |

Pulse test: * $t_p = 380 \mu\text{s}$, $\delta < 2\%$

To evaluate the maximum conduction losses use the following equation :
 $P = 0.22 \times I_F(\text{AV}) + 0.013 I_F^2(\text{RMS})$

Fig. 1: Average forward power dissipation versus average forward current.

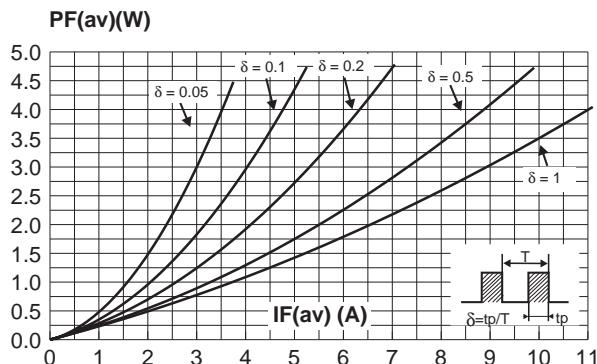


Fig. 2: Average forward current versus ambient temperature ($\delta = 0.5$).

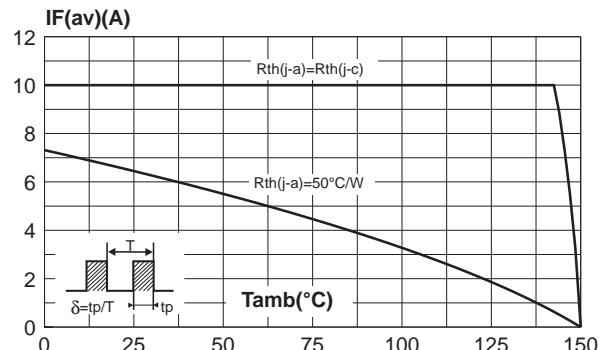


Fig. 3: Normalized avalanche power derating versus pulse duration.

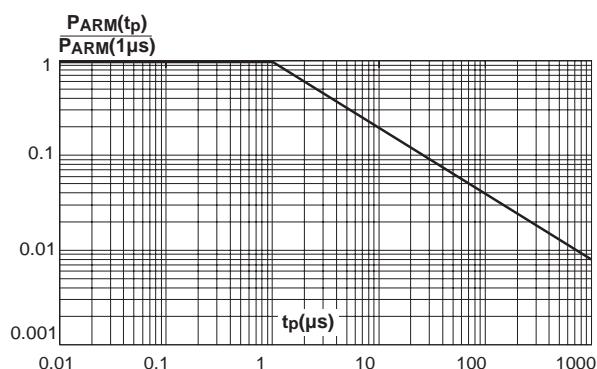


Fig. 4: Normalized avalanche power derating versus junction temperature.

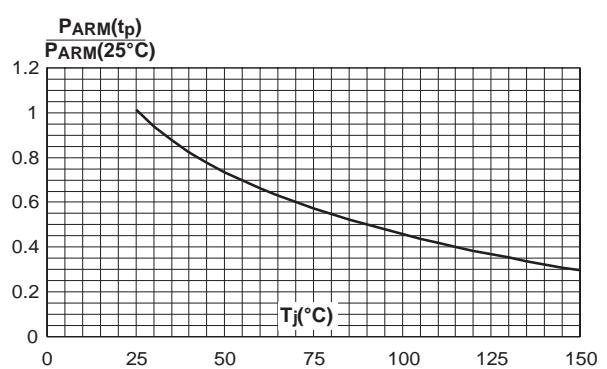


Fig. 5: Non repetitive surge peak forward current versus overload duration (maximum values).

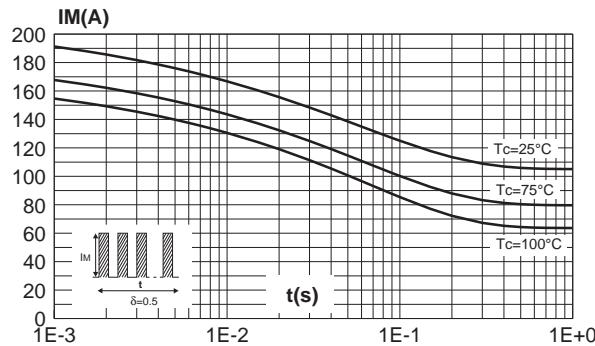


Fig. 6: Relative variation of thermal impedance junction to case versus pulse duration.

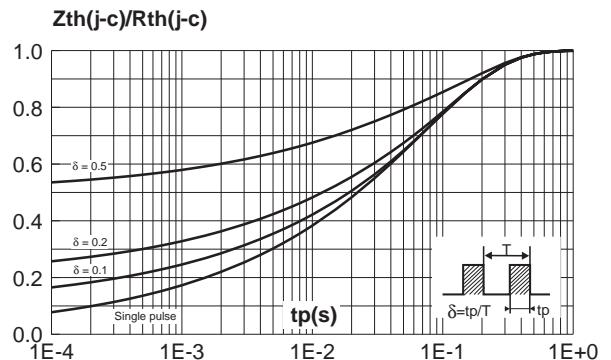


Fig. 7: Reverse leakage current versus reverse voltage applied (typical values).

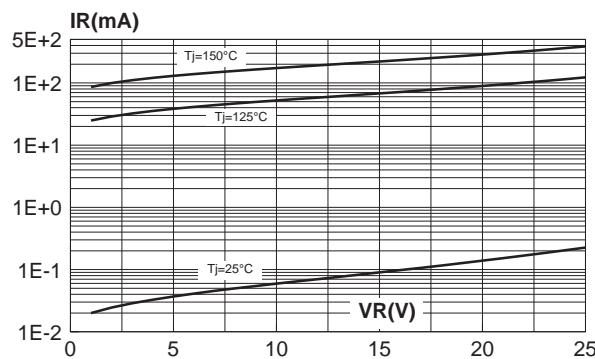


Fig. 8: Junction capacitance versus reverse voltage applied (typical values).

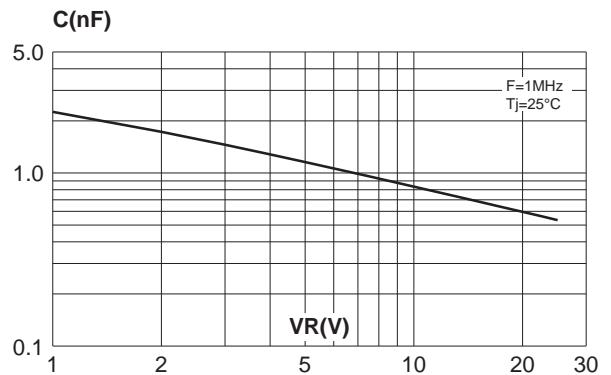


Fig. 9: Forward voltage drop versus forward current (maximum values).

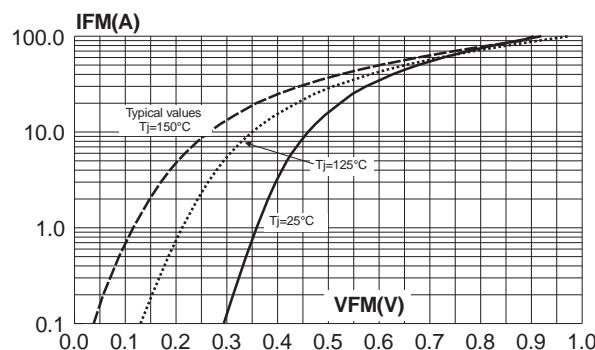
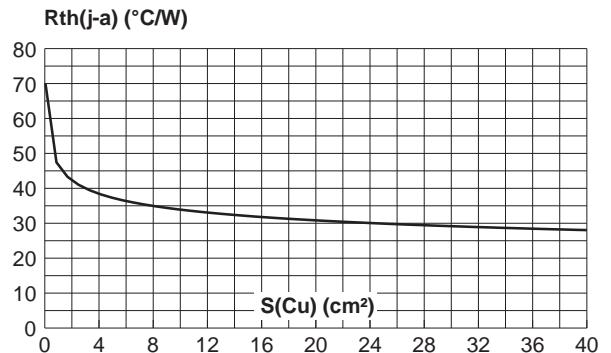
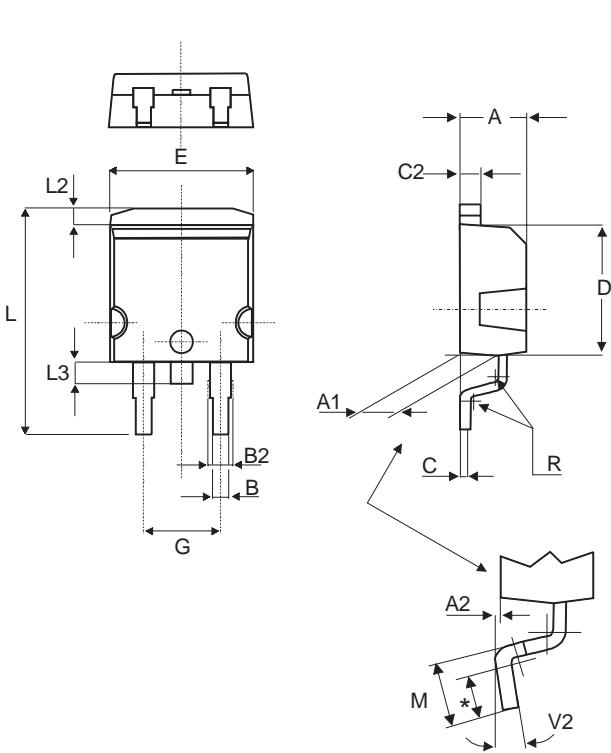


Fig. 10: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness : 35 μm). (STPS10L25G only)



STPS10L25D/G

PACKAGE MECHANICAL DATA D²PAK

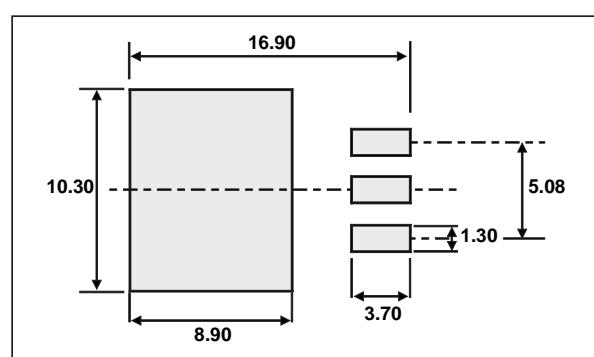


The technical drawing illustrates the physical dimensions of the STPS10L25D/G package. It includes a top view showing lead spacing (E), lead height (L), lead thickness (L2), lead width (L3), and lead pitch (G). A side view shows height (D), lead thickness (A), lead width (C2), lead pitch (B), lead height (B2), lead thickness (A1), lead width (C), lead height (R), lead thickness (A2), lead width (M), lead height (V2), and lead thickness (*). A cross-sectional view at the bottom shows lead thickness (M) and lead height (V2).

*** FLAT ZONE NO LESS THAN 2mm**

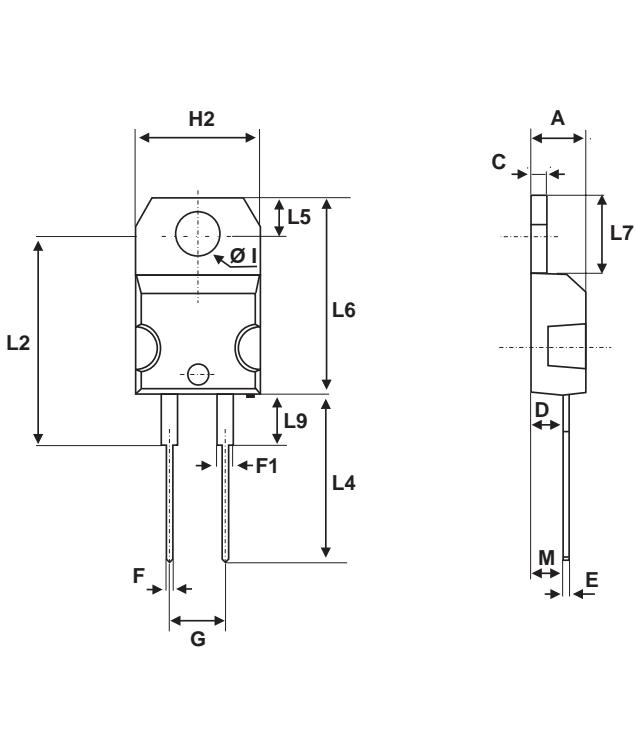
| REF. | DIMENSIONS | | | |
|------|-------------|-------|------------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| A1 | 2.49 | 2.69 | 0.098 | 0.106 |
| A2 | 0.03 | 0.23 | 0.001 | 0.009 |
| B | 0.70 | 0.93 | 0.027 | 0.037 |
| B2 | 1.14 | 1.70 | 0.045 | 0.067 |
| C | 0.45 | 0.60 | 0.017 | 0.024 |
| C2 | 1.23 | 1.36 | 0.048 | 0.054 |
| D | 8.95 | 9.35 | 0.352 | 0.368 |
| E | 10.00 | 10.40 | 0.393 | 0.409 |
| G | 4.88 | 5.28 | 0.192 | 0.208 |
| L | 15.00 | 15.85 | 0.590 | 0.624 |
| L2 | 1.27 | 1.40 | 0.050 | 0.055 |
| L3 | 1.40 | 1.75 | 0.055 | 0.069 |
| M | 2.40 | 3.20 | 0.094 | 0.126 |
| R | 0.40 typ. | | 0.016 typ. | |
| V2 | 0° | 8° | 0° | 8° |

FOOT PRINT DIMENSIONS (in millimeters)



- Cooling method: by conduction (method C)

PACKAGE MECHANICAL DATA
TO-220AC



| REF. | DIMENSIONS | | | |
|---------|-------------|-------|------------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| C | 1.23 | 1.32 | 0.048 | 0.051 |
| D | 2.40 | 2.72 | 0.094 | 0.107 |
| E | 0.49 | 0.70 | 0.019 | 0.027 |
| F | 0.61 | 0.88 | 0.024 | 0.034 |
| F1 | 1.14 | 1.70 | 0.044 | 0.066 |
| G | 4.95 | 5.15 | 0.194 | 0.202 |
| H2 | 10.00 | 10.40 | 0.393 | 0.409 |
| L2 | 16.40 typ. | | 0.645 typ. | |
| L4 | 13.00 | 14.00 | 0.511 | 0.551 |
| L5 | 2.65 | 2.95 | 0.104 | 0.116 |
| L6 | 15.25 | 15.75 | 0.600 | 0.620 |
| L7 | 6.20 | 6.60 | 0.244 | 0.259 |
| L9 | 3.50 | 3.93 | 0.137 | 0.154 |
| M | 2.6 typ. | | 0.102 typ. | |
| Diam. I | 3.75 | 3.85 | 0.147 | 0.151 |

- Cooling method : C
- Recommended torque value : 0.55 m.N
- Maximum torque value : 0.70 m.N

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|------------|--------------------|--------|----------|---------------|
| STPS10L25D | STPS10L25D | TO-220AC | 1.86g | 50 | Tube |
| STPS10L25G | STPS10L25G | D ² PAK | 1.48g | 50 | Tube |
| STPS10L25G-TR | STPS10L25G | D ² PAK | 1.48g | 1000 | Tape & reel |

- Epoxy meets UL94,V0

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